

FLOWERING PLANTS AROUND THE HOLY SHRINE OF KEDARNATH, UTTAR PRADESH¹

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(With a text-figure)

This paper gives an account of the angiospermic flora of Kedarnath, which is an alpine zone in Garhwal Himalaya. A list of 262 species of flowering plants represented by 149 genera and 52 families is given from 3200 to 3800 metre altitude a.s.l. The dominant families of the area are: Ranunculaceae, Brassicaceae, Caryophyllaceae, Rosaceae, Apiaceae, Asteraceae, Ericaceae, Primulaceae, Scrophulariaceae, Lamiaceae, Polygonaceae, Orchidaceae, Liliaceae and Poaceae.

INTRODUCTION

Garhwal Himalaya is famous for its vegetation and some of the noblest peaks of the world mountain system namely, Nanda Devi, Kamet, Trisul, Dunagiri, Chaukhamba, Nilkantha, Badrinath, Kedarnath and others. Kedarnath is the first among the Holy 'Panch (five) Kedars' of Uttarakhand, the other four being Madmaheshwar, Tungnath, Rudranath, and Kalpeshwar respectively. Mandakini river has its origin from Kedarnath glacier, and confluences with Alaknanda at Rudraprayag and Bhagirathi at Deoprayag whenceforth it is named 'Ganga'. The explored area lies in between 30° 40-45' N and 79° 0-5' E. The main rock components are of crystalline and metamorphic nature like other parts of the Himalayas (Fig. 1).

Compared with other sectors of the Himalayas, this region is humid. The characteristic feature of Kedarnath is the presence of marshy habitats, clothed with the typical marshy vegetation consisting of *Primula munroi*, *Juncus*

spp. *Triglochin palustre*, sedges and species of *Epilobium* and others. *Callitriche verna* is a delicate aquatic herb floating on the water surface of ditches in these marshy localities.

In this region timberline zone is not conspicuous, as is observed in most of the alpine regions of Garhwal Himalaya, however, the distributional pattern of the common taxa is the same. The trees other than *Betula utilis* are present up to the elevation of 3200 m or slightly more according to the aspect of the slopes. The tree population is very scarce at the upper limits and gradually increases in density towards lower elevations. The major elements of temperate forests are *Aesculus indica*, *Lyonia ovalifolia*, *Fraxinus excelsior*, *Buxus wallichiana* and species of *Acer*, *Pyrus*, *Carpinus*, *Quercus* and *Rhododendron*. The tree species reaching the highest limit are *Betula utilis*, *Syringa emodi*, *Viburnum foetens*, *Prunus cornuta*, *Abies pindrow*, *Taxus baccata* and species of *Acer*, *Pyrus* and *Rhododendron* associated with the shrubs like the species of *Berberis*, *Spiraea*, *Rosa*, *Cotoneaster* and climbers like the species of *Clematis*, *Smilax* and occasionally *Codonopsis*. *Elaeagnus umbellata* and *Pyrus lanata* can be seen here and there on road sides up to 3000 m along with *Piptanthus*

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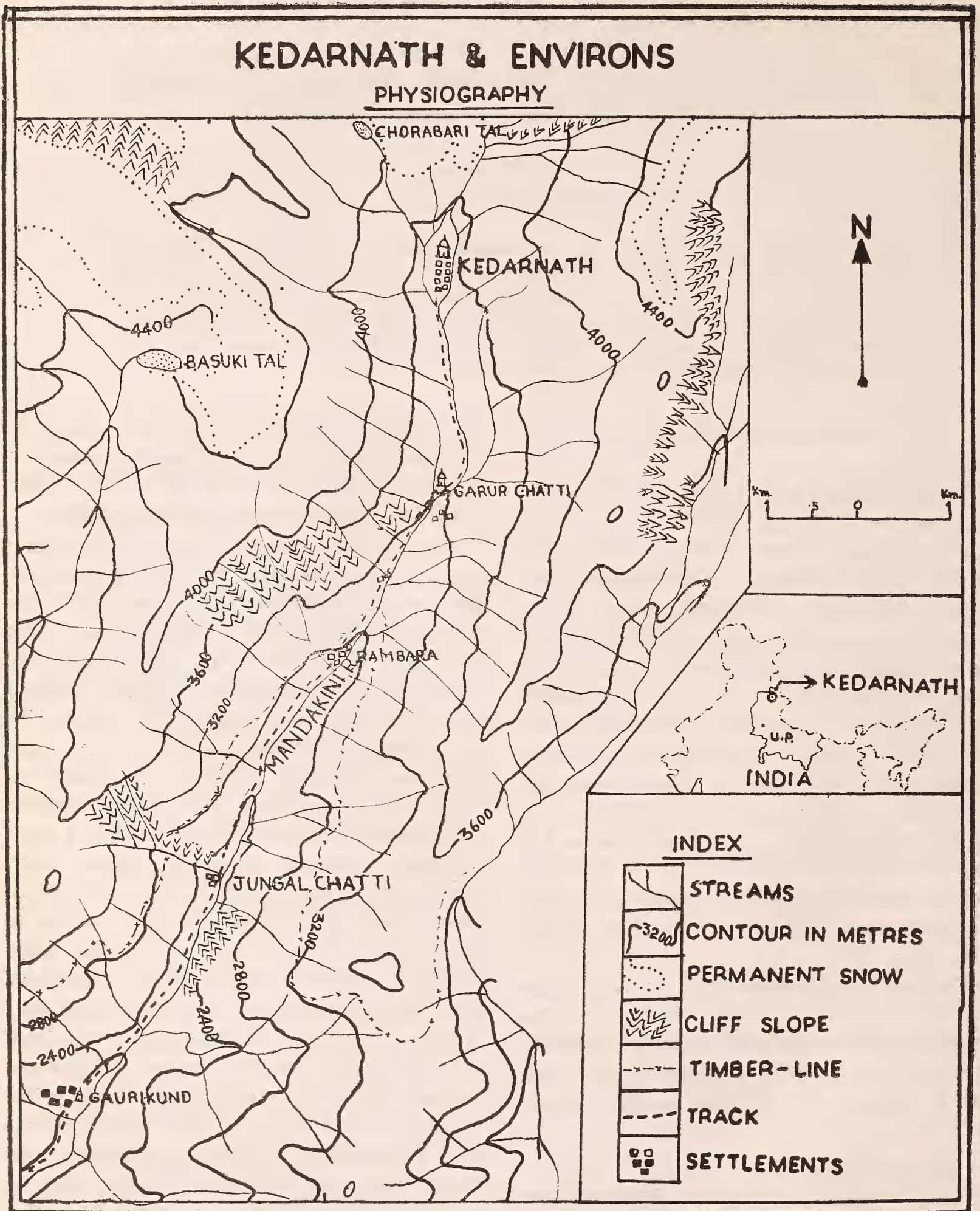


Fig. 1.

nepalensis, *Cotoneaster affinis* and some others. Unlike other alpine zones of the western Himalayas pure stands of the scrubs of *Rhododendron campanulatum* are lacking in this part.

The pattern of seasonal appearance of various plant species in this alpine zone is similar to that of Tungnath (Semwal *et al.*, 1981). The vegetation of the glacial bed is quite distinct compared to that of the meadows and marshy lands. The species found in these habitats are tufted and very much reduced in size forming the continuous interwoven matted cushions on the grounds. *Androsace villosa* and *Arenaria perlevis* are the typical examples of such vegetation, *Primula nivalis*, *P. minutissima* and *Helerpestes sermentosa* are found in rock crevices in these harsh habitats. The plant species on boulders and dry rocky faces are the species of *Sedum*, *Lychnis*, *Potentilla*, *Arcyosperma*, *Rheum*, *Senecio*, *Ligularia*, *Selinum*, *Goodyera* and many others. The vegetation of the ravines is constituted by the species of *Pedicularis*, *Epilobium*, *Impatiens*, *Polygonum* and *Rumex* etc. *Chamaenerion latifolium* and *Polygonum affine* are the most attractive species of the ravines. *Danthonia cuminsii* is the dominant alpine grass on steep slopes like in other alpine zones.

This alpine zone was previously explored by M. A. Rau during the last week of September 1958 (Rau 1961). He recorded about 53 species of flowering plants from Kedarnath. I have been working on the alpine flora of Tungnath (Semwal, 1981; Semwal *et al.*, 1981; Semwal and Gaur, 1981). During the course of these studies it was considered useful to explore the neighbouring alpine zones for comparison. Collections were made during early June 1978 and late July 1981. The specimens were compared with the authentic specimens of the 'Herbarium of Botanical Survey of India, Northern Circle Dehradun' (BSD) and are de-

posited in the herbarium of Garhwal University, Srinagar, U.P. Bentham and Hooker f.'s system is followed with slight modifications as proposed by Hutchinson (1973) in the arrangement of families.

The little known taxa recorded in the present work are, *Circaeaster agrestis*, *Gentiana albicalyx*, *Cypripedium elegans* and *Herminium pugioniforme*. *Circaeaster agrestis* was collected from an elevation of 3200 m and the other three were collected between 3500-3600 m altitudes.

ENUMERATION DICOTYLEDONS RANUNCULACEAE

***Aconitum heterophyllum* Wall. ex Royle**

Herb with dull green purple veined flowers. July, 1981. Semwal 7210.

***Anemone narcissifolia* Linn. var *polyanthes* Finnet et Gagnep.**

White flowered hairy herb on rocks. July, 1981. Semwal 7242.

***A. obtusiloba* D. Don**

Herb in meadows with white and blue flowers. June, 1978. Semwal 7157.

***A. rivularis* Buch.-Ham.**

Large herb with white flowers. July, 1981. Semwal 7167.

***A. tetrasepala* Royle**

Herb with cream-white flowers. June, 1978. Semwal 7179.

***Caltha palustris* Linn.**

Marshy herb with brilliant-yellow flowers. June, 1978. Semwal 7156.

***Clematis barbellata* Edgew.**

Climbers, sometimes spreading on grounds in alpine slopes, flowers purplish. June, 1978. Semwal 7168.

***Halerpestes sarmentosa* (Adms) Kom. et Klob**

Small glabrous herb with yellow flowers. July, 1981. Semwal 7221.

Oxygraphis polypetala (Royle) Hook. f. et Thoms.

Scapose glabrous herb with yellow flowers and persistent calyx. June, 1978. Semwal 7138.

Ranunculus diffusus DC.

Glabrascent herb with yellow flowers. June, 1978. Semwal 7162.

R. hirtellus Royle

Herb abundant in marshy meadows, flowers yellow. June 1978. Semwal 7159.

Thalictrum alpinum Linn.

Small glabrous herb with minute, drooping purple flowers. July, 1981. Semwal 7211.

T. minus Linn.

Erect herb with purplish flowers. July, 1981. Semwal, 7234.

BERBERIDACEAE

Berberis edgeworthiana Schneid.

Tall shrub with yellow flowers, spines few. June 1978. Semwal 7169.

B. jaeschkeana Schneid.

Spinous shrub with yellow flowers. July, 1978. Semwal 7184.

Podophyllum hexandrum Royle

Herb with palmate leaf and drooping fruit, very rare. July, 1981. Semwal 7212.

CIRCAEASTERACEAE

Circaeaster agrestis Maxim.

A small glabrous herb growing in crevices, perianth very much reduced, rare. July, 1981. Semwal 7213.

PAPAVERACEAE

Meconopsis aculeata Royle

Aculeate herb with sky-blue flowers, in ravines. July, 1981. Semwal 7217.

M. robusta Hook. f. et Thoms.

Robust herb with light yellow flowers, not common. July, 1981. Semwal 7171.

FUMARIACEAE

Corydalis cornuta Royle

Spreading yellow flowered herb. July 1981. Semwal 7165.

C. cashmeriana Royle

Small delicate herb with bulbous base and blue flowers. June, 1978. Semwal 7136.

C. govaniana Wall.

Tufted herb with yellow flowers. June 1978. Semwal 7147.

C. vaginans Royle

Glabrous herb with yellow flowers. July, 1981, Semwal 7215.

BRASSICACEAE

Arcyosperma primulifolium (Toms) O. E. Schulz

Lithophytic white flowered herb. June, 1978. Semwal 7141.

Barbarea vulgaris R. Br.

Erect herb with yellow flowers. June, 1978. Semwal 7158.

Draba gracillima Hook. f. et Thoms.

Weak herb with minute yellow flowers. June, 1978. Semwal 7142.

Lepidium ruderae Linn.

Glabrous herbs with fruits. July, 1981. Semwal 7208.

Megacarpaea polyandra Benth.

Large herb with dull white flowers. July 1981. Semwal 7371.

Sisymbrium wallichii Hook. f. et Thoms.

Herb with white flowers with long pods. July 1981. Semwal 7219.

Thlaspi andersonii (Hook. f. et Thoms.) O. E. Schulz

Herb with white flowers. June, 1978. Semwal 7148.

VIOLACEAE

Viola biflora Linn.

Small herb with yellow flowers. July, 1981. Semwal 7214.

V. serpens Wall.

Herb with violet flowers. June, 1978. Semwal 7170.

CARYOPHYLLACEAE

Arenaria perlevis (Williams) Handl.-Mazz.

Lithophytic white flowered herb. July, 1981. Semwal 7222.

Cerastium vulgatum Linn.

Herb with white flowers. June, 1978. Semwal 7127.

Gypsophila cerastioides D. Don

Herb with pink streaked flowers. July 1978. Semwal 7105.

Lychnis indica Benth.

Herb with fimbriate petals. June, 1978. Semwal 7172.

L. nutans Benth.

Pubescent herb with purplish flowers. July, 1981. Semwal 7254.

L. pilosa Edgew.

Herb on rocks with white flowers. July, 1981. Semwal 7246.

Sagina saginoides (Linn.) Karsten

Dark green glabrous white flowered prostrate herb. June, 1978. Semwal 7114.

Silene vulgaris (Moench) Garcke

Large glabrescent herb with greenish-white flowers. July, 1981. Semwal 7220.

Stellaria uliginosa Edgew. et Hook. f.

Apetalous spreading herb. July, 1981. Semwal 7185.

S. cherleriae (Fisch.) Williams

Cushioned herb with white flowers. July, 1981. Semwal 7223.

S. himalensis Majumdar

Glabrous herb with bright-white flowers. June, 1981. Semwal 7191.

S. patens D. Don

Diffused herb with white flowers. July, 1981. Semwal 7301.

HYPERICACEAE

Hypericum hookeriana Wt. et Arn.

Small shrub with large yellow flowers. July, 1981. Semwal 7312.

H. nepaulense Choisy

Herb with yellow flowers. July, 1981. Semwal 7224.

GERANIACEAE

Geranium collinum Stephan ex Willd.

Glabrous herb with dark pink flowers. July, 1981. Semwal 7227.

G. palustre Linn.

Large glabrescent herb with pink flowers. July, 1981. Semwal 7235.

G. wallichianum Sw.

Straggling herb with pink-purple flowers. July, 1981. Semwal 7236.

BALSAMINACEAE

Impatiens amplexicaulis Edgew.

Erect pink flowered herb. July, 1981. Semwal 7303.

I. glandulifera Edgew.

Tall herb in ravines with dark pink flowers. July, 1981. Semwal 7309.

I. thomsonii Hook. f.

Marsh herb with umbellate pale flowers. July, 1981. Semwal 7248.

RUTACEAE

Skimmia laureola Sieb. et Zucc.

Prostrate shrub, flowers greenish. June, 1978. Semwal 7186.

ACERACEAE

Acer acuminatum Wall. ex D. Don

Tree with white flowers and pink winged fruits. June, 1978. Semwal 7199.

A. caesium Wall. ex Brandis

Large tree, flowers white. June, 1978. Semwal 7188.

FABACEAE

Astragalus chlorostachys Lindl.

Erect herb with yellow flowers. July, 1981. Semwal 7225.

Lotus corniculatus Linn.

Decumbent herb with yellow or orange flowers. July, 1981. Semwal 7241.

Parochetus communis Buch.-Ham ex D. Don

Prostrate herb with blue flowers. July, 1981. Semwal 7187.

Piptanthus nepalensis D. Don

Pubescent shrub with yellow flowers. June, 1978. Semwal 7189.

Trifolium repens Linn.

Herb with white flowers in globose heads. June, 1978. Semwal 7174.

Trigonella pubescens Edgew. ex Baker

Diffused herb with yellow flowers. June, 1978. Semwal 7125.

ROSACEAE

Cotoneaster acuminatus Lindl.

Erect shrubs, flowers white. June, 1978. Semwal 7175.

C. rotundifolius Wall. ex Lindl.

Procumbent shrub with pinkish-white flowers. July, 1981. Semwal 7226.

Fragaria nubicola Lindl. ex Lacaita

Herb with white flowers. June, 1978. Semwal 7128.

F. daltoniana Gay

Stoloniferous herb with dark green leaves and white flowers. June, 1978. Semwal 7119.

Geum urbanum Linn.

Erect herb with yellow flowers. July, 1981. Semwal 7302.

G. elatum (Royle) Hook. f.

Leaves forming rosette, flowers large, yellow and drooping. July, 1981. Semwal 7255.

Potentilla cuneifolia Betrol.

Base shrubby, leaves glabrous, trifoliate, flowers yellow. July, 1981. Semwal 7228.

P. arbuscula D. Don

Shrubs on rocks with yellow flowers. July 1981. Semwal 7243.

P. argyrophylla Wall. ex Lehm.

Herb with silvery trifoliate leaves and yellow flowers. July, 1981. Semwal 7304.

P. atrosanguinea Lodd.

Herb with crimson-red flowers, abundant, June, 1978. Semwal 7159.

P. doubjouniana Camb.

Glabrescent herb on rocks with trifoliate leaves and yellow flowers. July, 1981. Semwal 7229.

P. fulgens Wall. ex Hook.

Silky herb with yellow flowers. June, 1978. Semwal 7176.

P. microphylla D. Don var. **commutata** Hook. f.

Herb, leaves green-glaucous above and pubescent beneath, flowers yellow. June 1978. Semwal 7149.

P. polyphylla Wall. ex Lehm.

Pubescent diffused herb with yellow corymbose flowers. July, 1981. Semwal 7262.

Rosa macrophylla Lindl.

Erect shrubs with large pink flowers. June, 1978. Semwal 7177.

R. sericea Lindl.

Shrub with white flowers. July, 1978. Semwal 7230.

Rubus nutans Wall.

Creeping shrubby herb with white flowers. June, 1978. Semwal 7178.

R. pedunculatus D. Don

Rambling shrubs with light pink flowers. June, 1978. Semwal 7183.

Sibbaldia cuneata Hornem. ex O. Ktze.

Creeping, base shrubby, flowers minute yellow. June, 1978. Semwal 7123.

S. micropetala (D. Don) Hand.-Mazz.

Diffused herbs with minute yellow flowers. July, 1981. Semwal 7315.

S. purpurea Royle

Similar to *S. cuneata* but with pentafoliate leaves and pink flowers. June, 1978. Semwal 7102.

Spiraea bella Sims.

Shrub with light pink flowers. July, 1981. Semwal 7263.

S. canescens D. Don

Shrub with white flowers. July, 1981. Semwal 7319.

S. vestita Wall. ex G. Don

Herbs, leaves pinnate, flowers greenish-white. July, 1981. Semwal 7249.

SAXIFRAGACEAE

Chrysosplenium tenellum Hook. f. et Thoms.

Delicate creeping glabrous herbs with small green-yellow flowers. June, 1978. Semwal 7132.

Parnassia nubicola Wall. ex Royle

Glabrous herb with single, sessile, cauline leaf, flowers solitary, terminal. July, 1981. Semwal 7207.

Saxifraga brachypoda Wall. var. **fimbriata** (Wall.) Engl. et Irmsch.

Tufted herbs with yellow flowers. July, 1981. Semwal 7247.

S. brunoniana Wall. ex Sternb.

Stoloniferous with solitary yellow flowers. July, 1981.

S. diversifolia Wall. ex DC.

Erect glabrous herbs with corymbose yellow flowers. July, 1981 Semwal 7305.

S. pallida Wall. ex DC.

Herb with white flowers. July, 1981. Semwal 7250.

GROSSULARIACEAE

Ribes glaciale Wall.

Shrub with unisexual purplish flowers. June, 1978. Semwal 7117.

CRASSULACEAE

Sedum bupleuroides Wall. ex Hook. f. et Thoms.

Fleshy herbs with purplish-red flowers. July, 1981. Semwal 7203.

S. heterodontum Hook. f. et Thoms.

Fleshy herbs with greenish or yellowish flowers. June, 1981. Semwal 7118.

S. imbricatum (Edgew.) Walp.

Herb on rocks with dull yellow flowers. July, 1981. Semwal 7232.

S. quadrifidum Pall.

Densely tufted herbs with small red flowers. July, 1981. Semwal 7206.

S. trullipetalum Hook. f. et Thoms.

Herbs on boulders with yellow flowers. July, 1981. Semwal 7233.

CALLITRICHACEAE

Callitriche verna Linn.

Delicate aquatic herbs floating on water surface. July, 1981. Semwal 7306.

ONAGRACEAE

Chamaenerion latifolium (Linn.) Sw.

Herbs with beautiful purple-pink flowers in glacial beds. July, 1981. Semwal 7238.

Epilobium laxum Royle

Erect glabrous herbs in marshy localities. July, 1981. Semwal 7307.

E. palustra Linn.

Herbs with pinkish-white flowers. July, 1981. Semwal 7317.

E. royleanum Hausskn.

Herbs with pink flowers. June, 1981. Semwal 7180.

APIACEAE

Acronema tenera Edgew.

Small herb in crevices with minute purplish flowers. July, 1981. Semwal 7239.

Bupleurum longicaule Wall. ex DC.

Glabrous procumbent herb with brownish-black flowers. July, 1981. Semwal 7308.

Heracleum brunonis (DC.) C. B. Clarke

Erect herb on rocky slopes with white flowers. July, 1981. Semwal 7318.

Selinum candollei DC.

Robust aromatic herbs with white umbels. July, 1981. Semwal 7279.

S. vaginatum C. B. Clarke

Herb in marshy places with dark-green glossy leaves and white flowers July, 1981. Semwal 7310.

Trachydium roylei Lindl.

Herb in the meadows with white flowers and black tipped fruits. July, 1981. Semwal 7369.

Vicatia conifolia DC.

Glabrous herb with fruits. June, 1978. Semwal 7152.

V. millefolia (Klotzsch) C. B. Clarke

Herb with small flowered umbels. June, 1978. Semwal 7164.

CAPRIFOLIACEAE

Lonicera asperifolia (Decne) Hook. f. et Thoms.

Shrub with yellow flowers. June, 1978. Semwal 7130.

L. myrtillus Hook. f. et Thoms. var **depressa** Rehder

Decumbent shrub with white flowers. June 1978. Semwal 7121.

L. obovata Royle ex Hook. f. et Thoms.

Shrub with white corolla gibbous at the base. June, 1978. Semwal 7116.

Viburnum foetens Decne

Small tree with white flowers and red drupes. June, 1978. Semwal 7181.

RUBIACEAE

Galium acutum Edgew.

Spreading herb with minute greenish-white flowers. July, 1981. Semwal 7240.

G. asperuloides Edgew.

Decumbent herbs with dull white flowers. July, 1981. Semwal 7244.

G. mollugo Linn.

Scabrous herbs with whitish flowers. July, 1981. Semwal 7311.

G. rotundifolium Linn.

Decumbent herbs, leaves in whorls of four, flowers white. June, 1978. Semwal 7182.

VALERIANACEAE

Valeriana hardwickii Wall.

Herb with white flowers. July, 1981. Semwal 7197.

DIPSACACEAE

Morina longifolia Wall. ex DC.

Spinous herbs with pink flowers. July, 1981. Semwal 7245.

ASTERACEAE

Anaphalis cuneifolia Hook. f.

Herbs with cuneate leaves and white flowers. June, 1978. Semwal 7190.

A. nepalensis (Spreng.) Handl-Mazz.

Woolly herbs with lanceolate leaves and white heads. July, 1981. Semwal 7341.

A. royleana DC.

Woolly herbs with dirty white heads. June, 1978. Semwal 7196.

Artemisia roxburghiana Besser var. **grata**

Hook. f.

Erect herbs, leaves green above and white beneath. July, 1981. Semwal 7348.

Aster peduncularis Wall.

Herbs with violet flowers. July, 1981. Semwal 7358.

Cicerbita cyanea (D. Don) Beauv.

Lithophytic herbs with blue flowers. July, 1978. Semwal 7355.

C. macrorhiza (Royle) Beauv.

Lithophyte, flowers purple-blue. July, 1981. Semwal 7350.

Dubyaea hispida (D. Don) DC.

Hispid herb with yellow heads. July, 1981. Semwal 7352.

Erigeron multiradiatus (DC.) Benth. et Hook. f.

Erect herbs with violet heads. July, 1981. Semwal 7363.

Gerbera lanuginosa Benth. var. **pusilla** Hook. f.

Small herb with solitary white heads. June, 1978. Semwal 7153.

Leontopodium himalayanum DC.

Woolly herbs with dull white heads. July, 1981. Semwal 7346.

Ligularia amplexicaulis DC.

Robust herbs with large glaucous leaves and yellow corymbose heads. July, 1981. Semwal 7354.

L. sibirica Cass. var. **racemosa** (DC.) Kitamura

Herbs with yellow racemose heads. July, 1981. Semwal 7366.

Myriactis javanica (Bl.) DC.

Erect herbs with purple heads. June 1978. Semwal 7175.

Saussurea hypoleuca Spreng.

Herb with drooping solitary heads. July, 1981. Semwal 7367.

S. lappa (Decne) Sch.-Bip.

Erect herb with purplish heads. July, 1981. Semwal 7356.

S. leontodontoides (DC.) Lipsch.

Herbs with sessile, purple heads. July, 1981. Semwal 7365.

S. obvallata (DC.) Sch.-Bip.

Robust aromatic herb with large translucent floral leaves. July, 1981. Semwal 7360.

S. piptathera Edgew.

Erect herb with simple leaves and purplish-violet heads. July, 1981. Semwal 7364.

S. taraxacifolia Wall. ex DC.

Aromatic herbs, acaulescent or almost so, heads purple. July, 1981. Semwal 7359.

Senecio chrysanthemoides DC.

Erect herbs with yellow corymbose heads, July, 1981. Semwal 7320.

S. kunthianus Wall. ex DC.

Aromatic herbs, leaves white tomentose below, heads yellow, corymbose. July, 1981. Semwal 7314.

Taraxacum officinale Weber

Glabrous scapose herb with solitary yellow heads. July, 1981. Semwal 7313.

CAMPANULACEAE

Campanula cashmeriana Royle

Herb with blue flowers. June, 1981 Semwal 7139.

Codonopsis rotundifolia Benth.

Climber with purple veined flowers. July, 1981. Semwal 7370.

Cyananthus lobatus Wall. ex Benth.

Glabrous herb with black calyx and dark blue flowers. July, 1981. Semwal 7368.

ERICACEAE

Cassiope fastigiata D. Don

Stem tufted, flowers drooping, white. June, 1978. Semwal 7139.

Gaultheria nummularioides D. Don

Decumbent shrubs, leaves with brown hairs on ventral surface, flowers light pink. June, 1978. Semwal 7161.

G. trichophylla Royle

Glabrous wiry herb with light pink flowers and sky blue fruits. July, 1981. Semwal 7135.

Rhododendron anthopogon D. Don

Creeping shrub with light yellow flowers. June, 1978. Semwal 7160.

R. arboreum Sm.

Small tree with large, red flowers. June, 1978. Semwal 7193.

R. campanulatum D. Don

Large shrubs with pale-purple flowers. June, 1978. Semwal 7198.

R. lepidotum Wall. ex G. Don

Small shrub with purplish-red flowers. July, 1981. Semwal 7199.

PRIMULACEAE

Androsace lanuginosa Wall. ex Roxb.

Spreading herb with lilac flowers. July, 1981. Semwal 7316.

A. villosa Linn.

Herb in glacial beds, forming dense cushions, flowers purple-lilac. July, 1981. Semwal 7264.

Lysimachia prolifera Klatt.

Prostrate herb with pale-purple flowers. July, 1981. Semwal 7259.

Primula denticulata Sm.

Scapose herb with pink-purple to pale-lilac flowers. June, 1978. Semwal 7133.

P. minutissima Jacq. ex Duby

Small herb in crevices with blue, solitary flowers. June, 1978. Semwal 7106.

P. munroi Lindl.

Marsh herb with white flowers. June, 1978. Semwal 7155.

P. nivalis Pall. var. **moorcroftiana** (Wall.) Pax.

Densely mealy herb with floral buds. June, 1978. Semwal 7104.

P. reidii Duthie

Hairy herb with cream-white flowers, on rocks. July, 1981. Semwal 7254.

OLEACEAE

Syringa emodi Wall. ex Royle

Small tree with fragrant white flowers. July, 1981. Semwal 7272.

GENTIANACEAE

Gentiana albicalyx Burkill

Small, stemless herb with imbricate leaves and white flowers. June, 1978. Semwal 7101.

G. argentea Royle ex D. Don

Herb with blue flowers, abundant in meadows. June, 1978. Semwal 7111.

G. capitata Buch.-Ham. ex D. Don

Glabrous herb with light blue flowers. June, 1978. Semwal 7107.

Swertia ciliata (G. Don) B. L. Burtt

Erect herb with purple flowers. July, 1981. Semwal 7260.

S. cuneata D. Don

Herb with blue flowers. July, 1981. Semwal 7281.

S. speciosa D. Don.

Robust glabrous herb with purple streaked, lurid-green flowers. July, 1981. Semwal 7324.

POLEMONIACEAE

Polemonium coeruleum Linn.

Herb, flowers blue. June, 1978. Semwal 7122.

BORAGINACEAE

Hackelia uncinata (Benth.) C. E. C. Fischer

Herb with blue flowers, yellow at the centre. July, 1981. Semwal 7261.

Lindelofia longiflora (Benth.) Baill.

Herb with intense blue drooping flowers. July, 1981. Semwal 7325.

Myosotis sylvatica Hoffm.

Hirsute herb with light blue flowers. July, 1981. Semwal 7201.

Onosma emodi Wall.

Hispid herbs on rocks with pink tipped flowers. July, 1981. Semwal 7251.

Trigonotis rotundifolia (DC.) C. B. Clarke

Abundant in meadows. Herb with blue flowers. July, 1981. Semwal 7109 and 7202.

SCROPHULARIACEAE

Euphrasia platyphylla Pennell

Small herbs with white flowers in terminal spikes. July, 1981. Semwal 7252.

Hemiphragma heterophyllum Wall.

Spreading herb with dimorphic leaves, pink flowers and red fruits. July, 1981. Semwal 7266.

Pedicularis hoffmeisteri Klotzsch

Glabrous herb with yellow flowers. July, 1981. Semwal 7253.

P. pectinata Wall. ex Benth.

Erect herb with purple flowers. July, 1981. Semwal 7327.

P. punctata Decne

Ravine herb with purple-red flowers. July, 1981, Semwal 7322.

P. rhinanthoides Schr. ssp. **labellata** (Jacq.)

Prain

In meadows. Herb with purple flowers. July, 1981. Semwal 7323.

Picrorhiza kurroa Royle ex Benth.

Glabrous prostrate herb with bluish flowers and bladdery seeds. June, 1978. Semwal 7108.

Scrophularia calycina Benth.

Robust herb with green flowers. June, 1978. Semwal 7115.

S. himalayensis Royle ex Benth.

Glandular herbs with greenish flowers. July, 1981. Semwal 7257.

Veronica cana Wall.

Erect herbs, flowers violet in terminal racemes. July, 1981. Semwal 7291.

V. macrostemon Bunge ex Ledeb.

Herb, flowers white in terminal clusters. July, 1981. Semwal 7321.

LAMIACEAE

Clinopodium umbrosum (M. Bieb.) Koch

Erect herbs with purple flowers. July, 1981. Semwal 7296.

Nepeta nervosa Royle ex Benth.

Herbs with blue flowers. July, 1981. Semwal 7265.

N. govaniana Benth.

Aromatic herbs with yellow flowers. July, 1981. Semwal 7278.

Phlomis bracteosa Royle ex Benth.

Robust herbs with purple flowers. July, 1981. Semwal 7299.

P. macrophylla Wall.

Hirsute herbs with purple flowers. July, 1981. Semwal 7298.

Prunella vulgaris Linn.

Herbs with dimorphic purple flowers. July 1981. Semwal 7256.

Salvia hians Royle ex Hook.

Viscid herbs, flowers blue. July, 1981. Semwal 7292.

Stachys sericea Wall.

Aromatic herbs with pale-purple flowers. July, 1981. Semwal 7300.

PLANTAGINACEAE

Plantago himalaica Pilger

Scapose glabrous herbs with green flowers. June, 1978. Semwal 7151.

POLYGONACEAE

Oxyria digyna Hill

Glabrous herbs in ravines, flowers pink or greenish. July, 1981. Semwal 7267.

Polygonum affine D. Don

Tufted herbs with creeping woody rootstock and red and pink flowers. July, 1981. Semwal 7326.

P. alpinum All.

Robust erect herbs with paniced white flowers. July 1981, Semwal 7338.

P. amplexicaule D. Don

Spreading herbs with crimson-red flowers. July, 1981. Semwal 7297.

P. delicatulum Meissn.

Glabrous annual herbs, flowers pale-white. July, 1981. Semwal 7287.

P. filicaule Wall. ex Meissn.

Strigose annual herbs with pink and white flowers. July, 1981. Semwal 7347.

P. glaciale Hook. f.

Annual herbs, flowers green and pink. July, 1981. Semwal 7344.

P. macrophyllum D. Don

Scapose herbs with red flowers in dense spikes, abundant in the marshy meadows. July, 1981. Semwal 7284.

P. rumicifolium Royle ex Bab.

Herb with purple and green flowers. July, 1981. Semwal 7293.

P. sinuatum Royle

Creeping herbs, flowers pink in solitary globose heads. July, 1981. Semwal 7289.

P. vacciniifolium Wall. ex Meissn.

Shrubs with pink flowers on rocks. July, 1981. Semwal 7343.

P. viviparum Linn.

Herb with bulbils, flowers light pink in spikes. July, 1981. Semwal 7329.

Rheum moorcroftianum Royle

On rocky slopes. Herb with large leaves, pink flowers and trigonous fruits. July, 1981. Semwal 7342.

R. emodi Wall. ex Meissn.

On rocks. Robust herbs with paniced white

flowers and winged fruits. July, 1981. Semwal 7283.

Rumex acetosa Linn.

Glabrous herbs with pink-purple flowers. June, 1978. Semwal 7143.

R. nepalensis Spreng.

Erect herbs with greenish flowers. July, 1981. Semwal 7269.

EUPHORBIACEAE

Euphorbia pilosa Linn.

Erect herbs with yellow or dull purplish involucral leaves around the cyathia. July, 1981. Semwal 7328.

E. stracheyi Boiss.

Herbs with tuberous roots and green cyathia. July, 1981. Semwal 7150.

URTICACEAE

Parietaria debilis Forst.

Annual diffused herbs, flowers minute, greenish. July, 1981. Semwal 7277.

Pilea wightii Weddel var. **roylei** Hook. f.

Small herbs, flowers pink in terminal cymose clusters. July.

BETULACEAE

Betula utilis D. Don

Deciduous tree with greenish spikes. July, 1981. Semwal 7330.

FAGACEAE

Quercus semecarpifolia Sm.

Large trees with green nuts. July, 1981. Semwal 7268.

SALICACEAE

Salix elegans Reichb.

Deciduous shrubs with catkins. June, 1978. Semwal 7163.

S. fruticulosa Anderss.

Shrubs, catkins with seeds embedded in white wool. June, 1978. Semwal 7131 and 7144.

S. karelinii Turez ex Stschez

Decumbent shrubs, catkins brownish-purple. June, 1978. Semwal 7146.

S. lindleyana Wall. ex Anderss.

Prostrate shrubs with yellow catkins. June, 1978. Semwal 7145.

MONOCOTYLEDONS

ORCHIDACEAE

Cypripedium elegans Reichb. f.

Herb with a pair of leaves and nodding solitary purple flower. June, 1978. Semwal 7166.

Goodyera fusca Hook. f.

Herbs, leaves mottled white, flowers white in spikes. June, 1978. Semwal 7173.

Herminium lanceum (Thunb.) Vuijk

Small herbs with pale yellow spikes. In meadows. July, 1981. Semwal 7220.

H. monorchis (Linn.) R. Br.

Herb with green flowers. July, 1981. Semwal 7218.

H. pugioniforme Lindl. ex Hook. f.

Herbs with minute greenish flowers. July, 1981. Semwal 7216.

Malaxis muscifera (Lindl.) O. Ktze

On rocks. Herbs with yellowish flowers in dense spikes. July, 1981. Semwal 7280.

M. acuminata D. Don

Beautiful herb with purple flowers. July, 1981. Semwal 7209.

Orchis chusua D. Don

Herb with purple flowers, very rare. July, 1981. Semwal 7331.

O. latifolia Linn.

Erect herb with palmate tubers and pink flowers, rare. June, 1978. Semwal 7124.

SCITAMINACEAE

Roscoea alpina Royle

Herb on rocks with purple-violet flowers. July, 1981. Semwal 7334.

HAEMODORACEAE

Aletris pauciflora (Klotzsch) Hand.-Mazz.

Small herbs with white flowers. July, 1981. Semwal 7296.

IRIDACEAE

Iris kumaonensis Wall. ex G. Don

Attractive herbs with bright blue flowers. June, 1978. Semwal 7129.

LILIACEAE

Clintonia udensis Trautv. var. **alpina** (Kunth ex Baker) Hara

Herbs with naked scapes and white flowers in terminal umbellate corymbs. July, 1981. Semwal 7276.

Fritillaria roylei Hook.

Herb with solitary terminal nodding greenish or pale-purple flowers. June, 1978. Semwal 7137.

Gagea lutea Schultz. f.

Herb with yellow flowers. June, 1978 Semwal 7140.

Nomocharis oxypetala (Royle) Balf. f. ex W.E. Evans

Herb with nodding yellow flowers. July, 1981. Semwal 7271.

N. nana (Klotzsch) E. H. Wilson

Herbs with purple-blue flowers. July, 1981. Semwal 7273.

Polygonatum multiflorum All.

Herb with alternate leaves and white flowers. July, 1981. Semwal 7295.

P. verticillatum All.

Herb with whorled leaves and white flowers. July, 1981. Semwal 7288.

Smilacina purpurea Wall.

Herb with purple flowers. July 1981. Semwal 7275.

Smilax vaginata Decne

Climber with small purplish flowers. July, 1981. Semwal 7335.

Trillium govanianum Wall. ex Royle

Herb with dark purple flowers. June, 1978. Semwal 7134.

JUNCACEAE

Juncus himalensis klotzsch et Garcke

On rocks. Herb with dark brown flowers. July, 1981. Semwal 7353.

J. membranaceus Royle ex D. Don

Herbs, flowers white in terminal heads. July, 1981. Semwal 7336.

Luzula multiflora (Retz.) Lej

Herbs with brownish-grey flowers. July, 1981. Semwal 7285.

JUNCAGINACEAE

Triglochin palustre Linn.

Marsh herb with pale-green flowers. July, 1981. Semwal 7214.

ARACEAE

Arisaema jacquemontii Blume

Herbs, spathe green. July, 1981, Semwal 7282.

A. wallichianum Hook. f.

Herbs, spathe purple. July, 1981. Semwal 7286.

CYPERACEAE

Carex nivalis Boott

Sedges, dark brown inflorescence. July, 1981. Semwal 7205.

Kobresia nitens C. B. Clarke

Sedges, spikes green. July, 1981. Semwal 7332.

POACEAE

Agrostis canina Linn.

Erect grass on rocky slopes, spikelets purplish. July, 1981. Semwal 7349.

A. munroana Aitch. et Hemsl.

Grass in meadows and rocky slopes. July, 1981. Semwal 7362.

A. pilosula Trin.

Grass with purple spikelets. July, 1981, Semwal 7339.

Calamagrostis emodensis Griseb.

Grass in rocky slopes. July, 1981. Semwal 7340.

C. pseudophragmites (Hall. f.) Koel.

Robust grass with brownish spikes. July, 1981. Semwal 7351.

Danthonia cuminsii Hook. f.

Dominant alpine grass in steep slopes. July, 1981. Semwal 7333.

Deyeuxia holciformis (Jaub. et Spach.) Bor

Robust grass on rocks, July, 1981. Semwal 7361.

D. pulchella (Griseb.) Hook. f.

Tall grass with purplish spikes. July, 1981. Semwal 7357.

Festuca kashmiriana Stapf

Grass in meadows with green spikes. July, 1981. Semwal 7345.

F. valesiaca Schleich. ex Gaud.

Grass in moist localities. July, 1981. Semwal 7274.

Phleum alpinum Linn.

Marsh grass, spikes green. June, 1978. Semwal 7120.

Poa supina Schrad.

A common grass, spikes green. June, 1978. Semwal 7112.

FLOWERING PLANTS AROUND THE HOLY SHRINE OF KEDARNATH

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